

PCT/GB2004/003794



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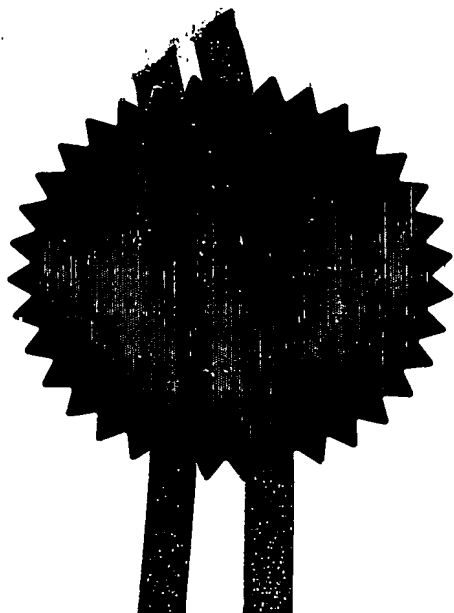
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*W. Evans*

Dated 27 September 2004



# Patents Form 1/77

Patents Act 1977  
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04SEP03 EB34966-1 C93534  
POL/7700 0.00-0320703.2

## Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

THE PATENT OFFICE  
- 4 SEP 2003  
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The Patent Office

Cardiff Road  
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1. Your reference

Bumper

2. Patent application number

(The Patent Office will fill this part in)

0320703.2

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Zero Shift Ltd  
The Coplan Building, Michigan Drive  
Tongwell, Milton Keynes MK15 8HQ  
8669301001

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

Improvements to Dog Engagement Mechanisms.

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

As above

Patents ADP number (if you know it)

6. Priority: Complete this section if you are declaring priority from one or more earlier patent applications, filed in the last 12 months.

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. Divisionals, etc: Complete this section only if this application is a divisional application or resulted from an entitlement dispute (see note f)

Number of earlier UK application

Date of filing  
(day / month / year)

8. Is a Patents Form 7/77 (Statement of inventorship and of right to grant of a patent) required in support of this request?

Answer YES if:

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

Otherwise answer NO (See note d)

Yes

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**Patents Form 1/77**

9. Accompanying documents: A patent application must include a description of the invention. Not counting duplicates, please enter the number of pages of each item accompanying this form:

Continuation sheets of this form NIL

Description 3

Claim(s) NIL

Abstract NIL

Drawing(s) 2 x 2

10. If you are also filing any of the following, state how many against each item.

Priority documents NIL

Translations of priority documents NIL

Statement of inventorship and right to grant of a patent (Patents Form 7/77) NIL

Request for a preliminary examination and search (Patents Form 9/77) NIL

Request for a substantive examination (Patents Form 10/77) NIL

Any other documents (please specify) NIL

11. I/We request the grant of a patent on the basis of this application.

Signature(s) 

Date 2/9/03

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

Bill Martin 07817 376 339  
bill.martin@zeroshift.com

**Warning**

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**Notes**

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 08459 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered YES in part 8, a Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- Part 7 should only be completed when a divisional application is being made under section 15(4), or when an application is being made under section 8(3), 12(6) or 37(4) following an entitlement dispute. By completing part 7 you are requesting that this application takes the same filing date as an earlier UK application. If you want the new application to have the same priority date(s) as the earlier UK application, you should also complete part 6 with the priority details.

### 'Improvements to Dog Engagement Mechanisms'

The present invention relates to an improved dog engagement mechanism. More specifically the present invention relates to improvements to a dog engagement system such that the corners of the dogs are protected. Dog engagement systems are mainly used on racing car gearboxes to engage and disengage gear. The present application applies to any application where rotational drive may be coupled and or decoupled to a gear, shaft or such like.

With conventional 'Dog-Engagement' systems in gearboxes it is common to experience the wear or rounding off of the corners of the dogs. Such wear can ultimately result in the loss of drive. The wear can occur upon engagement or disengagement. Upon engagement the corners of the dogs on the shaft (dog ring) can collide with the corners of the dogs on the gear thus causing damage.

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Wear upon disengagement occurs if the dogs are disengaged while under load thus rounding off the corners of the dogs as they pass each other on the way out.

It is one object of the present invention to substantially overcome these deficiencies.

In accordance with the present invention there is provided an improved dog-type engagement mechanism whereby the conventional dogs are replaced with dogs that have an additional region capable of preventing the corner of the shaft dogs from contacting the corner of the dogs on the gears thus preventing wear of the corners of the dogs.

The additional region is fitted to both the shaft dogs and the gear dogs in such a way that the two new regions will collide prior to the drive corners colliding thus creating a buffer. The blunt shapes of this buffer contact are designed to last longer than a conventional corner contact.

During full lock condition recesses are provided to accept the buffer regions.

Upon disengagement the buffer region must ramp out of the recess prior to unlocking thus moving the dog corners apart during unlocking.

The preferable location of the additional buffer region is beyond the radial extremity of the dogs.

It is conceivable that the new buffer region may itself wear out thus the dogs would then function conventionally. Nevertheless they will have had prolonged life due to the period the buffers were intact.

### **Brief Description of the Drawings**

The present invention will now be described by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of the gear showing the dogs with the additional bumper region in accordance with the embodiment.

Figure 2 is a perspective view of a typical mating dog also with the additional bumper region.

In Figures 1 and 2 there is shown elements of a dog engagement system 10. The dog engagement system 10 comprises a gear wheel 12 and shaft dog 14. As can best be seen in Figure 1, rotatably provided about gear 12 are gear dogs 16. The shaft dogs 14 engage gear dogs 16 fixedly provided about gear wheel 12.

Rotational power may be transferred to or from shaft (not shown) by way of the shaft dogs 14 and gear wheel dogs 16 as determined by positioning of the selector assembly (not shown).

The shaft dogs 14 are axially slidable along the shaft (not shown), whilst rotating in conjunction therewith.

As can best be seen in figure 1 the gear has three dogs 16, equidistantly spaced about the circumference. When the fork (not shown) causes the shaft dog sets to slide towards the gear 12 the gear dog faces 18 lock against the shaft dog faces 20 thus causing power transmission.

The corners 22 of the gear dogs 16 must not be able to collide with the corners 24 of the shaft dogs 14.

The corners 22 and 24 are protected by buffer regions 26 and 28.

Recess region 30 accommodates buffer 28 upon full lock.

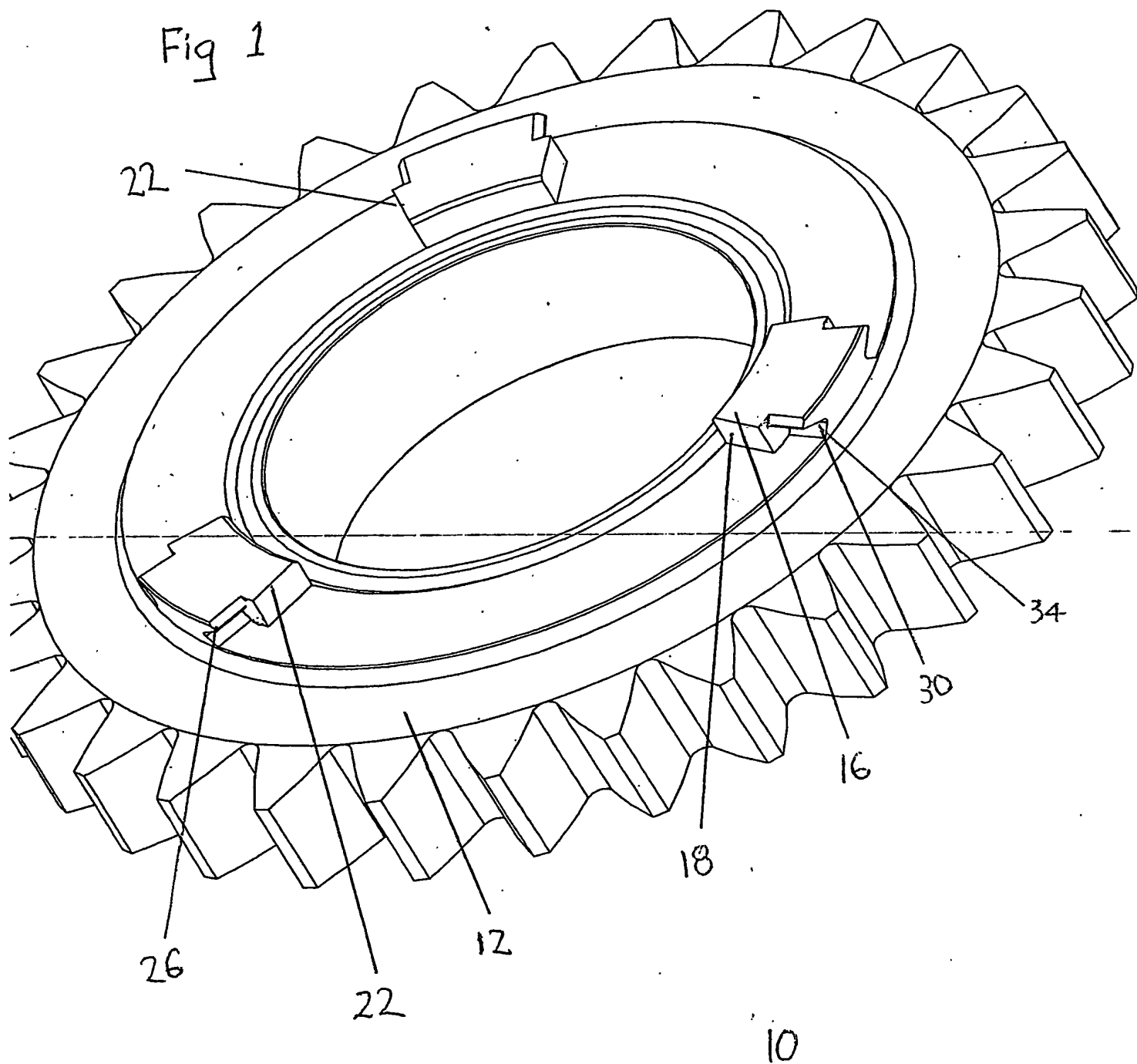
The ramped surfaces 32 and 34 cause the corners 22 and 24 to be parted during unlocking.

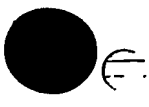
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Modifications and variations such as would be apparent to the skilled addressee are considered to fall within the scope of the present invention.

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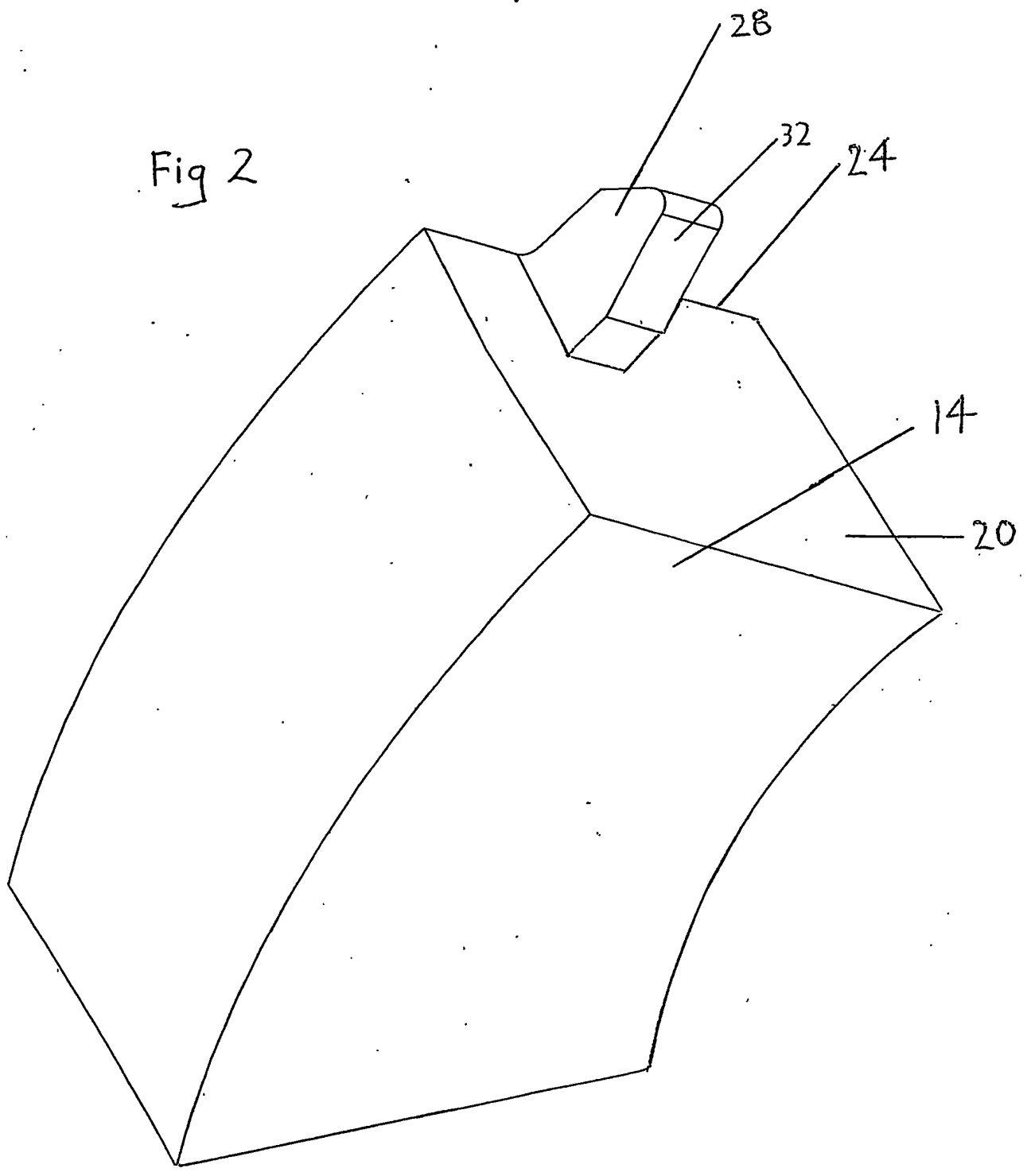
Fig 1





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Fig 2



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